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ACCESSION NR: AT501045

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AUTHOR: Kruchinin, S. P.; Mukhin, K. N.; Romantseva, A. S.; Svetolobov, I. A.;
Sul'kovskaya, M. M.; Chuyeva, S. A.; Shlyapnikov, R. S. 28
21
CH

TITLE: Elastic p-p scattering at 1.45 BeV

SOURCE: Moscow. Institut atomnoy energii. Doklady, no. 700, 1964. Uprugoye
(p-p)-rasseyaniye pri 1.45 BeV, 1-15

TOPIC TAGS: elastic scattering, proton proton scattering, pion scattering, differential cross section

ABSTRACT: A propane bubble chamber was used to investigate the angular dependence of elastic scattering of protons by protons at an incident-proton momentum of 2.2 BeV/c, which is higher than the energies used in earlier investigations. The protons came from the 10 BeV accelerator of the Joint Institute of Nuclear Research. A total of 17,000 pairs of stereophotographs was scanned, ~ 900 cases of elastic π^+p and pp scattering cases were analyzed, and the reduction of these data made it possible to determine the differential cross section of elastic pp scattering at 1.45 BeV over the entire angle interval of 0--90° (c.m.s.). Calculations based on

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the optical model with a small region of phase shift gave best agreement with the experimental data with parameter values $R_1 = 0.45 F$, $R_2 = 0.95 F$, $a = 0.344$, and $\varphi = 1.77$ rad. (R --interaction radius, φ --phase shift, a --amplitude of transmitted wave for a unit amplitude of incident wave). In the energy region from 0.38 to 30.9 BeV, the differential cross section is proportional to $A \exp(-P_{c.m.s.}/P_0)$, with $A = 115$ mb/sr and $P_0 = 143$ MeV/c. "The authors thank I. I. Gurevich for valuable advice, A. P. Benadiktov, V. I. Baranov, and A. V. Tel'nov for help in operating the equipment, and V. S. Balova, L. S. Baturina, and A. A. Kondrashina for participating in the measurements." Orig. art. has: 5 figures, 9 formulas, and 1 table.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: NP

NR REF SOV: 001

OTHER: 012

Card 2/2

| 2300

S/125/60/000/010/010/015
A161/A133

AUTHORS: Svetlopolyskiy, V.I., Gryazev, M.I., Svetlopolysanskaya, T.P.

TITLE: Nonferrous Hard-Facing of Ferrous Metals by the Electro-Slag Process

PERIODICAL: Avtomaticheskaya svarka, 1960, No. 10, pp. 64-66

TEXT: The Stalingrad Mining Engineering Institute has developed a new technique for the hard-facing of steel and cast iron with copper and bronze. The essence of the method is illustrated in Fig.1. The surface to be hard-faced may have any shape. It has to be surrounded by common molding materials and flux has to be filled into the mold. Flux of the AN-348 (AN-348A) type was used by the Institute, in a 30-50 mm deep layer. The work surface was carefully cleaned, and a single-phase CT3-24 (STE-24) welding transformer with a RCT3-24 (RSTE-24) current regulator was employed. The arc is excited between the electrode and the work surface to melt the slag, the arc burns several seconds, and a stable electro-slag process begins. Copper was fused onto steel with 300 amp and 25 volt current, and a hard-facing speed of 6 mm/sec. The layer being built-up forms from the melting copper electrode and fusing
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S/125/60/000/010/010/015
A161/A133

Nonferrous Hard-Facing of Ferrous Metals by the Electro-Slag Process

base metal. The joint is stable and without pores or cavities. The hard-facing quality is very high, due to the molten slag layer shielding the liquid copper from the air. The process is quiet without splatter. The welding current can be calculated using the formula $I_{\text{w}} = (1.25 \pm 8)F$, where I_{w} is the welding current in amp., and F the electrode cross section area, in mm^2 . When building up copper on cast iron, a copper sheet or fine copper chips were put under the slag layer, and a 16 mm diameter carbon electrode is used (for coating 20 x 40 mm specimens); the welding current was 250 amp, 25 volt, and the welding speed 4 mm/sec. The hardness of the built-up layer was $H_B = 114 \text{ kg/mm}^2$. t_p 04/ 5-5-5 (Br.OTsS 5-5-5) bronze was fused by a 16 mm diameter graphite electrode and either bronze strip or bronze chips were put under the slag; a welding current of 300 amp and 25 volt, and a melting speed of 5 mm/sec were used. It was found that the fusion depth may be increased by raising the current, reducing the cross section area of the electrode (melting or not), and slowing down the melting process. Hard-facings of any depth may be produced, and the joint is of high quality. The process makes possible an unlimited economy of nonferrous metals. The described Card 2/5

S/125/60/000/010/010/015
A161/A133

Nonferrous Hard-Facing of Ferrous Metals by the Electro-Slag Process

technology has been introduced at the Stalingrad Street Car Administration, for the repair of bearings, hard-facing of copper onto steel conductors, and repairing defects on cast iron and steel parts. There are 5 figures and 4 Soviet-bloc references.

ASSOCIATION: Stalingradskiy institut inzhenerov gornogo khozyaystva (Stalingrad Mining Engineering Institute)

SUBMITTED: May 5, 1960

Card 3/5

SVETLOPOLYANSKIY, V., starshiy prepodavatel'; CHEPURIN, M., starshiy
prepodavatel'

Technological problems in electric spark hardening of machine
parts. Zhil.-kom.khoz. 7 no.12:15-17 ' 57. (MIRA 11:12)

1. Stalingradskiy institut inzhenerov gorodskogo khozyaystva.
(Electric spark)

18.7000 2308, 10457 4167

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S/123/59/000/010/034/068
A004/A001

Translation from: Referativnyy zhurnal, Mashinostroyeniye, 1959, No. 10, p. 119,
38087

AUTHORS: Svetlopolyanskiy, V. I., Chapurin, M. S.

TITLE: Electric Spark Hardening of Metal Surface Layers

PERIODICAL: Stalindr. prom-st' (Sovnarkhoz Stalindr. ekon. adm. r-na), 1958,
Nos. 2-3, pp. 21-25

TEXT: For repair works the authors recommend an electric-contact build-up of worn components on the 5-electrode electric-spark apparatus of the TsNITMASH IE-2M (IYe-2M) design. This apparatus is characterized by the low operating voltage (up to 50 v), a high operating current (up to 30 amp per each electrode) and a high capacitance of the capacitor batteries (600 microfarad per each electrode), which makes it possible to obtain a diffusion layer up to 1.6 mm deep. The authors present the technical characteristics of the apparatus, the recommended specific hardening time of the electrode material and the hardening conditions for various components. There are 2 figures and 4 references. R. A. P.

Translator's note: This is the full translation of the original Russian abstract.
Card 1/1

SVETLOPOLYANSKIY, V., starshiy prepodavatel'

Cold welding of cast iron using electrodes without coating.
zhil.-kom.khos. 9 no.11:25-27 '59. (MIRA 13:2)

1. Stalingradskiy institut inzhenerov gorodskogo khozyaystva.
(Cast iron--Welding)

| 2300

S/125/60/000/010/010/015
A161/A133

AUTHORS: Svetlopolyanskiy, V.I., Gryazev, M.I., Svetlopolyanskaya, T.P.

TITLE: Nonferrous Hard-Facing of Ferrous Metals by the Electro-Slag Process

PERIODICAL: Avtomaticheskaya svarka, 1960, No. 10, pp. 64-66

TEXT: The Stalingrad Mining Engineering Institute has developed a new technique for the hard-facing of steel and cast iron with copper and bronze. The essence of the method is illustrated in Fig.1. The surface to be hard-faced may have any shape. It has to be surrounded by common molding materials and flux has to be filled into the mold. Flux of the AN-348 (AN-348A) type was used by the Institute, in a 30-50 mm deep layer. The work surface was carefully cleaned, and a single-phase CT3-24 (STE-24) welding transformer with a RSTE-24 (RSTE-24) current regulator was employed. The arc is excited between the electrode and the work surface to melt the slag, the arc burns several seconds, and a stable electro-slag process begins. Copper was fused onto steel with 300 amp and 25 volt current, and a hard-facing speed of 6 mm/sec. The layer being built-up forms from the melting copper electrode and fusing Card 1/5

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A161/A133

Nonferrous Hard-Facing of Ferrous Metals by the Electro-Slag Process

base metal. The joint is stable and without pores or cavities. The hard-facing quality is very high, due to the molten slag layer shielding the liquid copper from the air. The process is quiet without splatter. The welding current can be calculated using the formula $I_{\text{w}} = (1.25 \pm 8)F$, where I_{w} is the welding current in amp., and F the electrode cross section area, in mm^2 . When building up copper on cast iron, a copper sheet or fine copper chips were put under the slag layer, and a 16 mm diameter carbon electrode is used (for coating 20×40 mm specimens); the welding current was 250 amp, 25 volt, and the welding speed 4 mm/sec. The hardness of the built-up layer was $H_B = 114 \text{ kg/mm}^2$. For O4C 5-5-5 (Br.OTS 5-5-5) bronze was fused by a 16 mm diameter graphite electrode and either bronze strip or bronze chips were put under the slag; a welding current of 300 amp and 25 volt, and a melting speed of 5 mm/sec were used. It was found that the fusion depth may be increased by raising the current, reducing the cross section area of the electrode (melting or not), and slowing down the melting process. Hard-facings of any depth may be produced, and the joint is of high quality. The process makes possible an unlimited economy of nonferrous metals. The described Card 2/5

S/125/60/000/010/010/015
A161/A133

Nonferrous Hard-Facing of Ferrous Metals by the Electro-Slag Process

technology has been introduced at the Stalingrad Street Car Administration, for the repair of bearings, hard-facing of copper onto steel conductors, and repairing defects on cast iron and steel parts. There are 5 figures and 4 Soviet-bloc references.

ASSOCIATION: Stalingradskiy institut inzhenerov gornogo khozyaystva (Stalingrad Mining Engineering Institute)

SUBMITTED: May 5, 1960

Card 3/5

GRYAZEV, M.; SVETLOPOLYANSKIY, V., prepodavatel'

Pneumatic vibrating tie tempers. Zhil.-kom.khoz. 10 no.3:
28-29 '60. (MIRA 13:7)

1. Nachal'nik Upravleniya tramvaynogo khozyaystva g.Stalingrada
(for Gryazev).
2. Stalingradskiy institut inzhenerov gorodskogo
khozyaystva (for Svetlopolyanskiy).
(Railroads--Ties)

GRYAZEV, M. (g. Stalingrad); SVETLOPOLYANSKIY, V. (g. Stalingrad);
MIKHAYEV, N. (g. Stalingrad)

Pneumatic track lifter. Zhil.-kom.khoz. 10 no.9:26-27 '60.
(MIRA 13:9)
(Street railways--Track)

SVETLOPOLYANSKIY, Vasilii Ivanovich, inzh.; SMAGORINSKIY, B.S., red.;
IZHEOLDINA, S.I., tekhn. red.

[Electric-slag hard facing]Elektroshlakovaia naplavka. Stal-
ingrad, Stalingradskoe knizhnoe izd-vo, 1961. 63 p.
(MIRA 15:11)

(Hard facing)

SVETLOPOLYANSKIY, V.I., inzh. (Volgograd); KIRYUKHIN, V.S., inzh.
(Volgograd); KIRYUKHINA, V.V., inzh. (Volgograd)

Oxygen cutting of metals using natural gas. Zhil.-kom.
khoz. 12 no.1:25-26 Ja '62. (MIRA 15:6)
(Metal cutting) (Gas, Natural)

SVETLOPOLYANSKIY, V.I.

Electric slag welding of cast iron. Avtom.svar. 15
no.10:66-67 0 '62. (MIRA 15:11)

1. Volgogradskiy institut inzhenerov gorodskogo khozyaystva. " "
(Cast iron—Welding)

SVETLOPOLYANSKIY, V.I.

Semiautomatic machine for the electric slag welding of streetcar
rails on the track. Avtom. svar. 16 no.10:73-75 0 '63.

(MIRA 16:12)

1. Volgogradskiy institut inzhenerov gorodskogo khozyaystva.

GRYAZEV, Mikhail Ivanovich; SVETLOPOLYANSKIY, Vasiliy Ivanovich;
MIKHEYEV, Nikolay Stepanovich; NAUMENKO, V.S., red.

[Repair of streetcar tracks; practice of the Volgograd
Street-Railroad Administration] Remont tramvainykh putei;
iz opyta raboty Volgogradskogo TTU. Moskva, Izd-vo M-va
kommun.khoz.RSFSR, 1963. 36 p. (MIRA 17:10)

SVETLOPOLYANSKIY, V.I.; GRYAZEV, M.I.

Electric slag hard facing of cutters. Avtom. svar. 18 no.4;
57-58 Ap '65. (MIRA 18:6)

1. Volgogradskiy institut inzhenerov gorodskogo khozyaystva (for
Svetlopolyanskiy). 2. Volgogradskoye tramvaynoye upravleniye (for
Gryazev).

SVETLORUSOVA, L.P.

68-1-2/22

AUTHORS: Aronov, S.G., Doctor of Technical Sciences, and
Svetlorusova, L.P.

TITLE: The Influence of the Degree of Fineness of Coals and Coal
Blends During Coking (Vliyaniye stepeni izmel'cheniya
ugley i shikhty pri koksovanii)

PERIODICAL: Koks i Khimiya, 1958, No.1, pp. 5 - 11 (USSR)

ABSTRACT: The influence of the degree of fineness of coal blends on the strength of coke produced was investigated. The authors point out that the dependence between the degree of fineness, i.e., summary surface area of coal grains in a blend and the strength of the coke produced cannot be a straight line relationship, but that there should be an optimum grain size, different for different coals. In order to prove this assumption, they investigated the following problems: a) the thickness and strength of binding layers formed by coal, passing into the plastic state, between grains of materials which do not pass into the plastic state; b) the degree of interaction between the products of thermal decomposition of grains of various coals, and c) the depth of penetration of these products during the formation of coke.

a) The experimental technique was based on the principle of Cardl/6 caking a granular material which does not pass into the plastic

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The Influence of the Degree of Fineness of Coals and Coal Blends
During Coking.

of anthracite of about 5 000 cm²/g of coal and for K14 coal at 10 000 cm²/g of coal, thus indicating that the amount of plastic phase produced by the above two coals was different. The results obtained indicated the importance of specific surface area of weakly caking and non-caking components, excessively fine crushing of which has a deleterious effect on the strength of the coke produced. Similar experiments repeated with coke and sand indicated that the nature of the non-caking admixture is important. At the same specific surface area of admixtures per g of coal, the strongest coke was obtained with anthracite and the weakest with sand.

b) For this investigation, samples of coke were obtained by coking in a plastometric vessel either two lumps of different coals joined together with polished surfaces or crushed coals separated during charging by a copper foil which was withdrawn before coking. From these samples, polished sections were obtained which were examined under the microscope. Coking was carried out under a pressure of 0.1 kg/cm² to a final temperature of 950 °C. The following pairs of coals were examined: OS6-G6, Zh21-OS6, Zh21-G6; (lumps); Zh21-G6,

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The Influence of the Degree of Fineness of Coals and Coal Blends
During Coking.

(crushed 5-3 mm); Zh21-OS6 (crushed 2-1 mm); Zh21-G6 (crushed below 0.2 mm); Zh21-OS6 (crushed 5-3 mm); Zh21-OS6 (crushed below 0.2 mm); G6-OS6 (crushed 5-3 mm); OS6-G6 (crushed below 0.2 mm); Zh21 (5-3 mm), OS6 (2-1 mm). The respective results are shown in Figs. 2-12. It was found that some coals react only on the boundary without interpenetration, the boundary line remains clearly visible, others penetrate into each other forming a homogeneous structure. The latter coals on fine crushing showed a decrease in the interpenetration, the boundary line remains visible, while the former (OS6-G6) do not react at all, forming two separate cokes.

c) The depth of interpenetration of the products of thermal decomposition of various coals was measured, using radioactive $\text{Ca}^{45}\text{Cl}_2$ with which coal grains were coated before coking.

The experimental technique of coking was the same as for b). The results obtained are shown in Figs. 13-17. The depth of penetration was found to depend on the nature of coal and its fineness. An increase in the fineness of either "penetrating"

Card4/6 or "receiving" coals sharply decreases the degree of penetration.

SVETLOV, A. A.

AUTHORS: Borisov, K. I., and Svetlov, A. A.

72-2-6/10

TITLE: Progressive Method of Air Cooling of Bath Furnaces (Progressivnyy sposob vozdushnogo okhlazhdeniya vannyykh pechey).

PERIODICAL: Steklo i Keramika, 1957, Vol. 14, No. 2, pp. 22-25 (U.S.S.R.)

ABSTRACT: Reference is made to the empirical norms in use for air supply in cooling parts of glass furnaces to prevent etching away of the upper bars. The system based on these norms is found to be very complicated. A new centralized system is described and illustrated by three sketches. In sketch 1 1, e, and 4 are centrifugal fans (3 is a centrifugal fan placed on the floor of the shop--I variation; 4 is a centrifugal fan placed in the ventilation chamber located outside on brackets, II variation); 2 is an angular blow tube. In sketch 2 1 is a centrifugal fan; 2 is a blow nozzle; 3 is the metallic suspension arrangement.

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SVETLOV, A. (Moskva)

Two generations. Med. sestra 22.no.1:60-62 Ja '63. (MIRA 16:7)

(BARYSHNIKOVA, ANTONINA ALEKSEEVNA)
(CHUDINA. SANIIA SADYKOVNA)

SVETLOV, A.G., dotsent, kand. voyenno-morskikh nauk, kapitan 1-go; SHIMKEVICH,
L.A., kapitan 1-go ranga

Characteristics of an amphibious landing under modern conditions.
Mor. sbor. 47 no.3:22-27 Mr '64. (MIRA 18:7)

KLIBANSKIY, I.B., kand. tekhn. nauk; SVETLOV, A.I., inzh.

New machines for endurance tests and some results of these tests.
Nauka - proizv. no.1:62-79 '63.

(MIRA 18:3)

SVETLOV, A.I., red.-sostavitel'. Prinimali uchastiye: GOLOVANOV, S.I.;
GONOROVSKIY, P.A.; DOBRYNIN, M.I.; YERMILOV, Ye.M.; KORNEYEV, S.G.;
KULAKOVA, A.K.; KURBATOV, I.A.; LYKOV, V.N.; MARTYNOV, B.F.;
MILOSERDOV, S.S.; PESHKOV, V.P.; SOKHRANSKIY, A.V.; SMUROV, A.Ya.;
TOPALOV, V.S.; SHAPOVALOV, P.F.; POPOV, V.N., tekhn.red.

[City on the TSna] Gorod na TSne. Tambov, Tambovskoe knizhnoe
izd-vo, 1960. 174 p. (MIRA 14:4)
(Tambov--Guidebooks)

SVETLOV, A.I.

Device for testing bolts for slow deformation. Zav.lav. 26 no.3:
379-380 '60. (MIRA 13:6)

1. Institut mashinovedeniya Akademii nauk BSSR,
(Bolts and nuts--Testing)

SVETLOV, A. S.

Svetlov, A. S. "The achievements of the Michurinist cotton growers", (On the awarding of the Stalin Prize to I. S. Varuntsyan, I. Veliyev, and L. V. Rumshevich), Seleksiya i semenovodstvo, 1949, No. 5, p. 8-11.

SO: U-4630, 16 Sept. 53, (Letopis 'Zhurnal 'nykh Statey, No. 23, 1949).

AUTHOR: Svetlov, B. S.

SOV/ 156-58-3-5/52

TITLE: The Kinetics of the Change of Nitrogen Dioxide Content in the Products of the Decomposition of Nitroglycerin (Kinetika izmeneniya sodержaniya dvuokisi azota v produktakh raspada nitroglitserina)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Khimiya i khimicheskaya tekhnologiya, 1958, Nr 3, pp. 422 - 425 (USSR)

ABSTRACT: The author investigated the decomposition of nitroglycerin and nitroglycol. The course of the decomposition was traced by means of a Dubosque (Dyubosk) colorimeter, as well as by a glass Burdon manometer. The apparatus is described in short. The method was evaluated, and the deviation amounted to 5-6% with a maximum of 10%. Diagram 1 shows the change of the nitrogen dioxide content in the decomposition of nitroglycerin at various temperatures (130° , 120°) and m/v (g per $\text{cm}^3 \cdot 10^4$). The second part of diagram 1 shows the change of the velocity of vitrification. Diagram 2 shows the change in the content of nitrogen dioxide in the decomposition of nitroglycerin (140°); Diagram 3 shows the same for nitroglycol at 170° . It was found that the first reaction in the thermal decompo-

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The Kinetics of the Change of Nitrogen Dioxide Content SOV/156-58-3-5/52
in the Products of the Decomposition of Nitroglycerin

sition of nitroglycerin, the separation of nitrogen dioxide, is apparently followed by reactions in which nitrogen dioxide is reduced. The change in the nitrogen dioxide content is of complex character and depends on the temperature of the experiment. The velocity of gas formation is therefore here no measure of the velocity of merely a single chemical reaction. When the decomposition is highly accelerated the formation of nitrogen dioxide is also accelerated and its relative content begins to rise instead of falling. There are 3 figures and 6 references, 4 of which are Soviet.

ASSOCIATION:

Moskovskiy khimiko-tekhnologicheskii institut
im.D.I.Mendeleyeva (Moscow Chemical and Technological In-
stitute imeni D.I.Mendeleyev)

SUBMITTED: October 29, 1957

Card 2/2

SOV/76-32-8-5/37

AUTHORS: Andreyev, K. K., Glazkova, A. P., Maurina, N. D., Svetlov, B. S.

TITLE: The Thermal Decomposition of Nitro Esters (Termicheskiy raspad nitroefirov) I. Investigation of the Kinetics of the Decomposition of Nitroglycerin and Nitroglycol According to the Manometric Method (I. Issledovaniye kinetiki raspada nitroglitserina i nitroglikolya manometricheskim metodom)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 8, pp. 1726-1738 (USSR)

ABSTRACT: In the introduction the authors mention the investigations already carried out in this field and explain them; the papers by Robertson (Ref 1), Will (Vill) (Ref 2), S. Z. Roginskiy et al. (Ref 4), and A. Ya. Apin, O. M. Todes and Yu. B. Khariton (Ref 7) are mentioned. As the high temperature-coefficient of the decomposition rate of nitroglycerin does not depend on a high resistance of its molecule but on the heterogeneity of the course of decomposition a further investigation of this thermal decomposition especiall under simple conditions turns out to be interesting. A glass manometer with a thin-walled crescent-shaped glass membrane was used for the present experiments. The

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SOV/76-32-8-5/37

The Thermal Decomposition of Nitro Esters. I. Investigation of the Kinetics of the Decomposition of Nitroglycerin and Nitroglycol According to the Manometric Method

investigations in the vapor phase were carried out at 140, 150, and 165° and the maximum limit values of m/v were calculated according to the data by Brandner (Ref 11). It is assumed that in the thermal decomposition of nitroglycerin at least two macroscopic reaction stages exist as far as could be observed; also a reduction of the nitrogen dioxide to the oxide may take place. Thus, the rate of gas formation does not vary with time in strict accordance with an equation of a first order reaction. In the case of nitroglycol a similar result was obtained, with the difference that this process proceeded more quickly in the beginning. Experiments carried out in the liquid phase at small m/v and at temperatures of from 80 to 165° yielded values agreeing with those obtained by Robertson, although the intermediates were not removed. The decomposition in the liquid phase differs from that in the gas phase by the character of the $p = f(\tau)$ curves and the absolute value of the initial rate of gas formation. The effect of the decomposition products on the decomposition was investigated. Those with nitrogen dioxide were carried out by L. Ye. Tsebukhovskaya, and those with water by

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• The Thermal Decomposition of Nitro Esters. I. Investigation of the Kinetics
of the Decomposition of Nitroglycerin and Nitroglycol According to the
Manometric Method

G. N. Besspalov, student. Then the author thanks N. M. Emanuel'.
There are 10 figures, 2 tables, and 12 references, 6 of which
are Soviet.

ASSOCIATION: Khimiko-tekhnologicheskii institut im. D. I. Mendeleyeva, Moskva
(Institute of Chemical Technology imeni D. I. Mendeleyev,
Moscow)

SUBMITTED: January 23, 1957

Card 3/3

11.1300

20990

S/195/61/002/001/004/006
B101/B216

AUTHOR: Svetlov, B. S.

TITLE: Thermal decomposition of nitro-glycerin in the liquid phase

PERIODICAL: Kinetika i kataliz, v. 2, no. 1, 1961, 38-43

TEXT: The present study is mainly concerned with the self-accelerated thermal decomposition of nitro-glycerin in the liquid phase. The investigation was carried out at temperatures ranging from 80 to 140°C at volume ratios δ of nitro-glycerin to reaction vessel of 10^{-3} to 10^{-1} . As shown in Fig. 1, decomposition occurs in two stages. The first stage exhibits no self-acceleration, even at considerable accumulation of reaction products but, as illustrated in Fig. 2, a marked dependence of the rate W of gas formation on δ , especially at higher temperatures.

Fig. 2 shows the ratio $W(\delta)/W(\delta = 10^{-3})$. An activation energy of 43.6 kcal/mole was calculated for $\delta = 10^{-3}$, and 39.3 kcal/mole for $\delta = 10^{-1}$. The formation of NO_2 which reaches a concentration of 40-60% in the gas

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Thermal decomposition of ...

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is characteristic of the first stage. The second stage, the intensive acceleration of decomposition, sets in only when the pressure of the gases formed has reached a certain critical value which in the range $\delta = 10^{-3} - 10^{-1}$ is a temperature-dependent constant, independent of the degree of decomposition. The following values for the critical pressure were found (in mm Hg): at $\delta = 6 - 60 \cdot 10^{-3}$ and 80°C , 60-80; at 100°C , 180-210; at 120°C , 400-500; at $\delta = 15 \cdot 10^{-3}$ and 140°C , 1000; at $\delta = 29 \cdot 10^{-3}$ and 140°C , 800. The existence of a critical pressure and the peculiar decomposition character are assumed to be due to reaction of the condensed phase with the gaseous products. The total rate of gas formation is given as $dP/d\tau = W + kP^2$, where W is the rate of processes not accelerated by decomposition products, P the pressure of the gaseous products, and k a coefficient of proportionality. The validity of equation $dP/d\tau - W = f(P)$ was verified by experiment, as illustrated in Fig. 4. Curve 2 of this figure represents the total gas formation as a function of pressure at 100°C . B. I. Kaydymov, B. S. Samsonov, and S. Z. Roginskiy are mentioned. The author thanks

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S/195/61/002/001/004/006
B101/B216

Thermal decomposition of ...

K. K. Andreyev for taking interest in the study. There are 4 figures and 10 references: 8 Soviet-bloc and 2 non-Soviet-bloc. The reference to the English-language publication reads as follows: J. B. Levy, J. Amer. Chem. Soc., 76, 3254, 3790, 1954.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskii institut im. D. I. Mendeleyeva (Moscow Institute of Chemical Technology imeni D. I. Mendeleyev)

SUBMITTED: June 11, 1960

Card 3/5

21767

S/195/61/002/002/001/004
B101/B208

//.1260

AUTHOR:

Svetlov, B. S.

TITLE:

The role of nitrogen dioxide in the self-accelerated decomposition of nitroglycerin

PERIODICAL:

Kinetika i kataliz, v. 2, no. 2, 1961, 179-183

TEXT: NO₂, the first product of thermal decomposition of organic nitro compounds, acts as an oxidant and catalyst of hydrolytic decomposition. This action is assumed to be particularly intense at low temperatures in which case it is highly soluble in nitro compounds. The present study performed in co-operation with Yu. B. Dodonov deals with the determination of NO₂ solubility in nitroglycerin. Nitroglycerin purified by vacuum distillation (melting point 12.9°C) was used, and NO₂ was obtained by decomposition of lead nitrate. The solubility was determined as follows: a) gravimetrically: NO₂ was bubbled through 100-150 mg nitroglycerin at constant pressure in an evacuated vessel which was placed in a thermostat. The increase in weight which became constant after about 20 min, was measured on a quartz spring balance; b) manometrically: 1 g nitroglycerin was evacuated in

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S/195/61/002/002/001/004
B101/B208

The role of ...

ampuls, cooled with liquid N_2 , and a known amount of NO_2 was added. Considering the equilibrium $NO_2 \rightleftharpoons N_2O_4$ according to M. Bodenstein (J. phys. Chem., 100, 75, 121, 1922), the quantity of the dissolved NO_2 was determined from the pressure change. The study was performed at NO_2 pressure of 100-900 mm Hg, at 20-80°C. The results (Fig. 1) show that the solubility of NO_2 in nitroglycerin is proportional to the 1.5-2.3 th power of the pressure. The partial pressure of N_2O_4 in the system $NO_2 - N_2O_4$ being proportional to the 1.4-1.9 th power of the total pressure, it may be concluded that mainly N_2O_4 is dissolved in nitroglycerin. The equilibrium $NO_2 \rightleftharpoons N_2O_4$ is shifted to the right in the solution. This is confirmed by the solubility N as a function of $p_{N_2O_4}$, as shown in Fig. 2. $N = K \cdot p$; N = molar N_2O_4 concentration in nitroglycerin, K = solubility constant, mm^{-1} ; p = partial pressure of N_2O_4 , mm Hg. The results of the gravimetric and the manometric methods were in good agreement. The following mean values were found for $K \cdot 10^4$, mm^{-1} :

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Temperature, °C:	20	30	40	50	60	70	80
$K \cdot 10^4$:	17.0	11.1	7.69	5.48	4.40	2.92 2.09

The following equation was derived by the least square method:

$\log K = (3060 \pm 100)RT - 8.032$. The N_2O_4 content of nitroglycerin is

proportional to the partial pressure of the former, and proportional to the 1.5-2.0-th power of the total pressure of nitrogen oxides. The following was found in the paper by K. K. Andreyev et al. (Zh. fiz. khim., 32, 1726, 1958); K. K. Andreyev (Zh. prikl. khim., 31, 484, 1958), and by the author (Kinetika i kataliz, 2, 38, 1961) on the self-accelerated decomposition of nitroglycerin and nitroglycol: At a critical pressure, the gas evolution slowly increasing at the beginning of the experiment reaches a rate proportional to the square pressure of the gaseous decomposition products. At 80°C and for the ratio δ of the volume of nitroglycerin to the volume of the ampul = 0.009-0.06, $P_{crit} = 60-80$ mm Hg; at 100°C, $\delta = 0.0015-0.06$, $P_{crit} = 180-210$ mm Hg; at 120°C, $\delta = 0.003-0.06$, $P_{crit} = 400-500$ mm Hg. Experiments at 140°C with $\delta = 0.015$ and 0.029 gave for P_{crit} the values

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The role of ...

1000 and 800 mm Hg, respectively. The N_2O_4 concentration corresponding to P_{crit} was now calculated by extrapolation (in wt%), it was for 80°C equal to $(0.1-0.4) \cdot 10^{-2}$; for 100°C $(0.3-0.8) \cdot 10^{-2}$; for 120°C $(0.3-0.8) \cdot 10^{-2}$. [Abstracter's note: presumably a typographical error] for 140°C $(0.4-1.2) \cdot 10^{-2}$. The interaction with other decomposition products has not been considered. The present paper is not concerned with the problem of the mechanism of self-accelerated decomposition of nitroglycerin. The accelerating role of N_2O_4 , however, is not in contradiction with the assumption of a hydrolytic decomposition with subsequent interaction of the decomposition products, which is accelerated by increasing N_2O_4 content and corresponding increasing HNO_3 formation. On the basis of experimental data [Abstracter's note: not given] the same scheme also holds for nitroglycol. G. N. Bespalov is mentioned. There are 2 figures, 1 table, and 12 references: 8 Soviet-bloc and 4 non-Soviet-bloc. The most recent reference to English language publications reads as follows: B. Levy, J. Amer. Chem. Soc., 76, 3254, 3790; 1954.

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The role of ...

S/195/61/002/002/001/004
B101/B208

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskii institut im. D. I.
Mendeleyeva (Moscow Institute of Chemical Technology imeni D. I.
Mendeleyev)

SUBMITTED: June 11, 1960

Fig. 1: Influence of the pressure of nitrogen oxides upon their solubility in nitroglycerin. Legend: 1) 20°C; 2) 30°C; 3) 40°C; 4) 50°C; 5) 60°C; 6) 70°C; 7) 80°C; a) log of concentration C in wt%; b) log P_{total} .

Fig. 2: Influence of N_2O_4 pressure upon its solubility in nitroglycerin. Legend see Fig. 1.

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S/020/61/137/003/028/030
B103/B208

11. P300

AUTHORS: Svetlov, B. S., and Fogel'zang, A. Ye.

TITLE: Burning of lead styphnate

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 3, 1961, 654-655

TEXT: The authors studied the burning of initiating explosives, particularly of lead styphnate (Pbst). Contrary to other initiating explosives (mercury fulminate, trinitrotriazobenzene) which burn very quickly and steadily in pressed state, the burning rate of Pbst could not be studied in spite of a high pressing density, because the charge exploded. Only by adding large quantities of other substances these charges burned with high velocity. Pbst was pressed with a pressure of 5000 kg/cm² into plexiglass tubes (thickness of the wall 2 mm, inside diameter 4 mm). In this way, a steady and uniform burning of Pbst was attained over the entire length of the charge. The authors studied the dependence of the burning rate on the pressure in a wide range. Burning was recorded by a photographic recorder. Fig. 1 illustrates the dependence mentioned above. The authors conclude therefrom that Pbst is able to burn even at

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Burning of lead styphnate

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B103/B208

very low pressure. Its burning rate is very high even at 15 mm Hg (25-26 cm/sec). Pbst burns vigorously and with an explosion-like noise, although the tube, as a rule, remains intact, and the photographic recorder shows a constant burning over the entire length of charge. Bad pressing gives rise to an explosion after a comparatively short range of steady burning, the tube breaking into pieces. For comparison, Fig. 1 includes diagram (1) of the burning of lead picrate which does not burn at low pressure (below 20 kg/cm²). In the range where lead picrate burns under the given conditions, it burns nearly 30 times more slowly than Pbst. The maximum difference is 10-15% at a pressure of more than 200 kg/cm². At atmospheric pressure, the burning rate of Pbst exceeds that of similar explosives by about 15-20 times. A rapid change from burning to detonation is not warranted by a high burning rate alone. There are 2 figures and 3 Soviet-bloc references.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskii institut im. D. I. Mendeleyeva (Moscow Institute of Chemical Technology imeni D. I. Mendeleyev)

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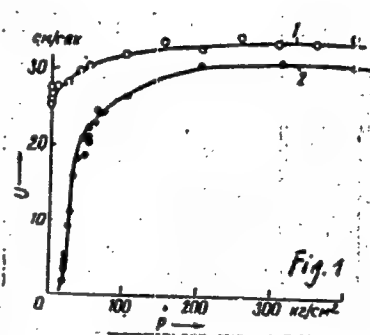
Burning of lead styphnate

S/020/61/137/003/028/030
B103/B208

PRESENTED: October 31, 1960, by V. N. Kondrat'yev, Academician

SUBMITTED: October 21, 1960

Legend to Fig. 1: Pressure dependence of the burning rate of Pbst (1) and lead picrate (2). Abscissae: pressure kg/cm^2 , ordinates: burning rate cm/sec .



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L 17954-63

EPR/EPT(c)/EWT(m)/BDS AFFTC/RPL PS-1/Pr-1 RM/KW/JK/JWD/R

ACCESSION NR: AT3006075

S/2938/63/000/000/0184/0190

AUTHOR: Syetlov, B. S.

70
69

TITLE: Thermal decomposition of nitroglycerine in liquid phase

SOURCE: Teoriya vzryvchatykh veshchestv, sbornik statey, 1963, 184-190

TOPIC TAGS: explosive, nitroglycerine, liquid phase of explosive

ABSTRACT: The thermal decomposition of nitroglycerine in liquid phase was studied at temperatures from 80 to 140C in the presence of the decomposition products. The presence of two macroscopic stages during the decomposition of nitroglycerine was established. Their course depends only upon the content of decomposition products and not upon the decomposition depth. In the first stage of decomposition, the gaseous decomposition products, for all practical purposes, do not show an accelerating effect upon the gas formation rate. The initial velocity of the first stage depends upon the degree of filling of the reaction vessel and is characterized by a normal.

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L 17951-63

ACCESSION NR: AT3006075

temperature coefficient for nitroethers of this velocity. In the second stage of decomposition, the gas formation rate depends upon the pressure of the gaseous decomposition products and can exceed the initial velocity by at least a hundred times. The obtained results are observed with the assumption that two processes take place simultaneously in the decomposition of nitroglycerine. The first consists of spontaneous decomposition which is not accelerated by the gaseous decomposition products. In the second process, the interaction of nitroglycerine takes place with its decomposition products. "The author expresses his gratitude to K. K. Andreyev for his constant interest in this work." Orig. art. has: 4 figures.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 14 Jun 63

ENCL: 00

SUB CODE: AR, CH

NO REF SOV: 008

OTHER: 002

Card 2/2

L 7956-63 EPR/EPF(c)/EWT(m)/BDS AFETC/RPL Pa-1/Pr-1 RM/WW/JI/JWD/H

ACCESSION NR: AT3006077

S/2938/63/100/000/0197/0208

AUTHORS: Gorbunov, V. V.; Svetlov, B. S.

TITLE: Effect of water and acid upon self-accelerating decomposition of nitroglycerine.

SOURCE: Teoriya vzry*chaty*kh veshchestv, sbornik statey, 1963, 197-208

TOPIC TAGS: explosive, nitroglycerine, nitric acid

ABSTRACT: Authors studied the thermal decomposition of nitroglycerine in the presence of water and nitric acid of various concentrations at temperatures of 40 to 100C under conditions where the decomposition products added to the nitroethers are almost completely dissolved in it. It was shown that water decreases the induction period of the nitroglycerine decomposition approximately equally throughout the studied temperature range. However, the effect of nitric acid on the induction period is lower than that of water at a high temperature; and it is considerably greater at a low temperature. The induction period has been evaluated at 20C for a moist and acidic nitroglycerine by means of extrapolation. It was shown that, at 40 and 60C, the induction period of nitroglycerine

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L 17956-63

ACCESSION NR: AT3006077

decomposition decreases the most with 25 - 40% nitric acid. Water and nitric acid, introduced in various concentrations into the nitroglycerine, primarily effect the processes which shorten the induction period. The experiments with sharply increased decompositions to which water and nitric acid were added showed the same mechanism as the pure nitroglycerine. Orig. art. has: 11 figures.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 14Jul63

ENCL: 00

SUB CODE: AR, CH

NO REF SOV: 005

OTHER: 001

Card 2/2

L 17955-63

EPR/EPF(c)/EWT(m)/BDS

APFTC/RPL

Ps-1/Pr-1

RM/WW/JW/JWD/H

S/2938/63/000/000/0190/0197

ACCESSION NR: AT3006076

AUTHORS: Gorbunov, V. V.; Svetlov, B. S.

TITLE: Effect of temperature upon decomposition of nitroglycerine

SOURCE: Teoriya vzryvchatykh veshchestv, sbornik statey, 1963, 190-197

TOPIC TAGS: explosive, nitroglycerine, nitroethers

ABSTRACT: The decomposition of nitroglycerine at low temperatures (40 to 100C) was studied. Authors show that decomposition of nitroglycerine at these temperatures proceeds qualitatively, similar to the decomposition of nitroglycerine at much higher temperatures (80 to 140C). This similarity is due to presence of two macroscopic stages: critical pressure and the approximate proportionality of the gas formation rate in the second stage to the square of pressure of the decomposition products. Simultaneously with the known similarity, the authors also show the quantitative differences in the decomposition of nitroglycerine at low and high temperatures. The dependence of the initial gas formation rate upon the temperature is less pronounced at low temperatures. In the second decomposition stage, the critical rate increment of the gas formation amounts to about

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I 17955-63

ACCESSION NR: AT3006076

15 kcal/mole in contrast to high temperatures at which the gas formation rate in the second stage is practically independent of the temperature. The induction period of decomposition of nitroglycerine at 20C was evaluated. Results were compared with the effect of the degree of filling of the reaction vessel as a possibility of removing the gaseous products of decomposition from nitroethers. A method of studying the thermal decomposition of explosive materials has been developed, using the maximum degree of filling of the reaction vessel which makes it possible to expand the range of temperatures to much lower levels. "The authors express their gratitude to K. K. Andreyev for his substantial guidance, discussion and formulation of results." Orig. art. has: 5 figures.

ASSOCIATION: None

SUBMITTED: OO

DATE ACQ: 14Jun63

ENCL OO

SUB CODE: AR, CH

NO REF SOV: 004

OTHER: 001

Card 2/2

L 17957-63 EPR/EPF(c)/EWT(m)/HDS (PPTC/RPI Ps-1/Pr-1) RM/WM/JW/JND/H

ACCESSION NR: AT3006078

S/2938/63/000/000/0208/0214

AUTHOR: Svetlov, B. S.

TITLE: Effect of nitrogen dioxide during self-accelerating decomposition of nitroglycerine

SOURCE: Teoriya vzry*chaty*kh veshchestv, sbornik statey, 1963
208-214

TOPIC TAGS: explosive, nitroglycerine, nitrogen dioxide, gravimetric analysis, manometric analysis

ABSTRACT: Author studied the decomposition of nitrogen dioxide in nitroglycerine. Two methods of study were utilized: Gravimetric and Manometric. The dependence of the solubility of nitrogen dioxide upon its equilibrium pressure in nitroglycerine was determined by the gravimetric method. The results show that the solubility of NO_2 in nitroglycerine is proportional to its pressure. The solubility also increases with an increase in temperature. The partial pressure of N_2O_4 in the system $\text{NO}_2\text{-N}_2\text{O}_4$ is approximately proportional to the total

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L 17957-63

ACCESSION NR: AT3006078

pressure of the mixture. If it is assumed that, during the decomposition of nitroglycerine, the oxidation takes place mainly with the participation of N_2O , then the decomposition rate during a sharp acceleration is proportional to the concentration of N_2O_4 , since NO_2 in the solution associates to N_2O_4 . Study of thermal decomposition of nitroglycerine showed that, at a certain critical pressure of the decomposition products, the gas formation rate is proportional to the square of the pressure. Orig. art. has: 1 table and 2 figures.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 14 Jul 63

ENCL: 00

SUB CODE: AR, CH

NO REF SOV: 007

OTHER: 004

Card 2/2

L 17958-63 EPR/EFF(e)/EWT(m)/BDS AFPTG/RPL Ps-4/Pr-4 RM/WW/JW/JWD/H
 3/2938/63/000/000/0211/0219
 70

AUTHORS: Gorbunov, V. V.; Svetlov, B. S.

TITLE: The role of condensed products during decomposition of nitroglycerine

SOURCE: Teoriya vzryvchatykh veshchestv, sbornik statey, 1963, 214-219

TOPIC TAGS: explosive, nitroglycerine, condensed products of explosion, nitroether, oxalic acid

ABSTRACT: Authors attempted to show the presence of condensed products and to evaluate their role during the decomposition of nitroglycerine. During the partial decomposition of nitroglycerine and after the removal of the volatile products, gas formation proceeded at a high rate. It decreased, however, with time. Its temperature coefficient is smaller than the temperature coefficient of gas formation during the decomposition of the pure nitroglycerine. The decomposition of the partly-decomposed nitroglycerine is qualitatively similar to the decomposition of this nitroether in the presence of oxalic acid. The thermal decomposition of partly-decomposed nitroglycerine proceeded as if it had non-volatile products in its composition. The decomposition rate constant is much

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L 17958-63

ACCESSION NR: AT3006079

larger than the rate constant of nitroglycerine itself. During the self-accelerating decomposition of nitroglycerine in the presence of decomposition products, the rate of the process is determined not only by the highly-volatile products, but, apparently, also by the formation of non-volatile intermediate decomposition products. Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 14Jun63

ENCL: 00

SUB CODE: AR, CH

NO REF SOV: 007

OTHER: 000

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L 18177-63 EPR/EPF(c)/EWT(m)/BDS AFPTC/RPL Pa-4/Pr-4 RM/WW/JW/JWD/H
 8/2938/63/000/000/0274/0280 7/

ACCESSION NR: AT3006083

AUTHOR: Svetlov, B. S.

TITLE: Liquid phase thermal decomposition of diethyleneglycoldi-
 nitrate

SOURCE: Teoriya vzry*chaty*kh veshchestv, sbornik statey, 1963,
 274-280

TOPIC TAGS: explosive, diethyleneglycoldinitrate, Arrhenius
 equation, nitroether, PETN

ABSTRACT: Authors studied the liquid phase decomposition of diethy-
 leneglycoldinitrate in the presence of decomposition products at
 temperatures between 60 and 150C. The effect of the degree of fill-
 ing of the ampule with nitroether was studied. The initial rate of
 gas formation conforms to Arrhenius equation where $E=41-42$ kcal/mole
 and $\log B=16.5$, which corresponds to the decomposition constants of
 other liquid phase nitroethers. Decomposition of diethyleneglycol-
 dinitrate under the conditions of this experiment proceeds slowly

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L 18177-63

ACCESSION NR: AT3006083

without sharp acceleration. It does not accelerate even with the addition of water. The absence of noticeable quantities of nitrogen dioxide in the decomposition products of diethyleneglycoldinitrate can be explained by the fact that the oxidizing processes during the decomposition proceed considerably faster than the primary splitting of nitrogen dioxide. This explains the characteristics of diethyleneglycoldinitrate decomposition, which differs from the decomposition of nitroglycerine, nitroglycol and PETN. At comparatively low temperature (60C and lower) the decomposition of diethyleneglycoldinitrate proceeds many times slower than that of nitroglycerine. Orig. art. has: 6 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 14Jun63

ENCL: 00

SUB CODE: AR, CH

NO REF SOV: 005

OTHER: 001

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L 18176-63 EPR/EPF(c)/EWT(m)/BDS AFPTC/RPL Pa-l/Pr-l RM/WW/JW/JWD/H
ACCESSION NR: AT3006084 S/2938/63/000/000/0281/0296 70

AUTHORS: Lur'ye, B. A.; Svetlov, B. S.

TITLE: Effect of some admixtures upon the thermal decomposition of
diethyleneglycoldinitrate //

SOURCE: Teoriya vzry*vyaty*kh veshchestv, sbornik statey, 1963,
281-296

TOPIC TAGS: explosive, diethyleneglycoldinitrate, oxygen, nitrogen
oxide, nitrogen dioxide, nitric acid, oxalic acid

ABSTRACT: Authors studied the thermal decomposition of DEGD (die-
thyleneglycoldinitrate) in the presence of oxygen, nitrogen oxide,
nitrogen dioxide, nitric acid and oxalic acid at temperatures from
80 to 120C. It was found that, at higher temperatures, liquid DEGD
is capable of interacting with oxygen, nitrogen oxide and nitrogen
dioxide, resulting in a decrease of volume of these gases. The re-
action of oxygen and nitrogen dioxide was also established with the
diethyleneglycol itself. Concentrated nitric and oxalic acids

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L 18176-63

ACCESSION NR: AT3006084

accelerate the decomposition of DEGD as much as a hundred-fold. Dilute nitric acid accelerates the separation of gases. Dilute oxalic acid slows down the decomposition of DEGD. In the presence of certain substances which accompany the accumulation of NO₂ during the decomposition of DEGD, the sharp acceleration of gas separation changes to a maximum suppression of gas formation and a gradual disappearance of nitrogen dioxide. Orig. art. has: 14 figures.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: 14Jun63

ENCL: 00

SUB CODE: AR, CH

NO REF SOV: 006

OTHER: 002

Card 2/2

I. 37703-65

ACCESSION NR: AP5006706

ing the 35 years of his scientific career, K. K. Andreyev published some 150 papers. He studied extensively the combustion of explosives, and the kinetics and mechanism of their thermal decomposition; the transition of combustion to explosion and detonation; the detonation capability of explosives and powders; their sensitivity to mechanical interactions; the production of useful gaseous products during explosions; the theory of explosion safety; and the like. His main concern centered around the main point - the theory of combustion of explosives. He was the first to study, more than 30 years ago, the combustion of secondary explosives. In the thirties and forties he designed now universally accepted instruments for the study, at constant pressure, of the combustion of explosives. He established differences in the combustion capability of various explosives and proposed, as a criterion, the critical combustion diameter. He formulated qualitatively the concept of ignitability and combustion capability. He was one of the first to study the transition from combustion to explosion experimentally. In the mid-forties he observed the self-agitation during the combustion of liquid explosives experimentally, which had been predicted theoretically L. D. Landau. In contradistinction to numerous researchers abroad, Andreyev also studied the thermal decomposition of mononitrates at that time and investigated nitroglycerin, nitroglycol, nitrocellulose, and the like. He showed that the decomposition of polynitrates is actually a

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L 37703-65

ACCESSION NR: AP5006706

multistage process. His contributions to the theory of explosives are of such importance that he may rightly be considered the founder of this important branch of science. In 1960, together with A. F. Belyayev, he published the basic textbook on the theory of explosives. During his pedagogical career, Prof. Andreyev taught hundreds of engineers and sponsored some 25 doctoral candidates. He was honored by receiving several high decorations.

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: 00, WA

NO REF SOV: 000

OTHER: 000

Card 3/3 PMB

L 19696-63

WM/JW/MAY/JWD/H

ACCESSION NR: AP3006615

EPR/EPF(c)/EWT(m)/BDS AFFTC Ps-4/Pr-4 RM/

S/0076/63/037/009/1979/1984

AUTHOR: Svetlov, B. S.; Lur'ya, B. A.

TITLE: Characteristics of the thermal decomposition of dinitroxy-ethylnitramine

SOURCE: Zh. fizicheskoy khimii, v. 37, no. 9, 1963, 1979-1984

TOPIC TAGS: nitro ester, explosive, thermal decomposition, liquid explosive, chemical stability, stability, nitric acid, dinitroxy-ethylnitramine, decomposition, storage stability

ABSTRACT: The thermal decomposition of dinitroxyethylnitramine (DINA) was studied in the presence and absence of water and nitric acid at 60—170C in order to determine both the effect of reaction products on the decomposition rate and the decomposition characteristics at low temperatures. The experiments were conducted in a pressure bomb filled to varying degrees with DINA. The initial bomb pressure was 1 mm Hg. The pressure increase was measured as

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L 19696-63

ACCESSION NR: AP3006615

2
a function of time, and the concentration of NO_2 in the decomposition products was determined colorimetrically. Some results are shown in Figs. 1-4 of the Enclosure. The following conclusions were drawn: 1) Thermal decomposition of DINA can take place by two different mechanisms: one involves spontaneous decomposition and resembles the mechanism observed with other nitroesters; the other takes place at low temperatures, involves hydrolysis accompanied by oxidation, and is characterized by strong self-acceleration. 2) In contrast to nitroglycerine, DINA exhibits a tendency to self-inhibition. 3) At low temperatures the decomposition rate of DINA after accumulation of decomposition products may be more than 100 times, and in the presence of water 1000 times, the initial decomposition rate. 4) The chemical stability of DINA is basically determined by the presence of water, which may induce self-accelerating hydrolysis, and by nitric acid, which it may contain as a technical impurity. Orig. art. has: 7 figures.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskii institut im. D. M. Mendeleeva (Moscow Institute of Chemical Technology)

Card 2/02

SVETLOV, B.S.; FOGEL'ZANG, A.Ye.

Pulsating combustion of iron picrate. Vzryv. delo no.52/9;
221-225 '63. (MIRA 17:12)

1. Moskovskiy ordena Lenina khimiko-tekhnologicheskoy institut
imeni D.I. Mendeleyeva.

ZEL'DOVICH, Ya.B.; SEMENOV, N.N.; KHARITON, Yu.B.; BELYAYEV, A.F.; GLAZKOVA,
A.P.; KONDRIKOV, B.N.; ORLOVA, Ye.Yu.; SVETLOV, B.S.

Konstantin Kostantinovich Andreev, 1905-1964. Zhur. fiz. khim.
39 no.2:534-536 F '65. (MIRA 18:4)

ACC NR: AP7000010

SOURCE CODE: UR/0076/66/C40/011/2889/2891

AUTHOR: Svetlov, B. S.; Shelaputina, V. P.

ORG: Moscow Chemical Technology Institute (Moskovskiy khimiko-tekhnologicheskiy institut)

TITLE: Study of the kinetics of acid hydrolysis of certain polynitrates of polyhydric alcohols

SOURCE: Zhurnal fizicheskoy khimii, v. 40, no. 11, 1966, 2889-2891

TOPIC TAGS: nitroglycerin, ethylene glycol dinitrate, rocket propellant, propellant, liquid explosive, high explosive, thermal decomposition, *hydrolysis, chemical kinetics, ethylene glycol, nitrate, nitric acid*

ABSTRACT: A study has been made of the kinetics of the homogeneous acid hydrolysis of nitroglycerin and ethylene glycol dinitrate in the presence of small concentrations of dissolved nitric acid and water at 20—80C. It is noted that the capacity of polynitrates toward auto-acceleration of thermal decomposition has been attributed to hydrolysis accelerated by the nitric acid formed. The low reaction temperature (20—80C) was selected so as to minimize self-induced decomposition. A flask of the nitrate with added nitric acid of the desired concentration was placed in a thermostat. Periodically, a sample was withdrawn

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UDC: 542.938:541.124/128

ACC NR: AP7000010

and nitric acid was determined to within 10^{-6} g. It was found that neutral hydrolysis (no HNO_3 added) of the nitrates occurred at a very low rate if at all. Acid hydrolysis (on addition of HNO_3 of concentration $\gg 10\%$) proceeded vigorously and was autocatalytic in character: the rate of formation of HNO_3 was approximately proportional to the initial HNO_3 concentration in the mixture (but virtually independent of the water concentration). Comparison of the rates of monomolecular and hydrolytic decomposition showed that the rate of hydrolysis at HNO_3 concentrations of the order of $10^{-4} - 10^{-3}\%$ is commensurate with the thermal decomposition rate. This confirms that hydrolysis is the main cause of the autoaccelerating decomposition of polynitrates whose decomposition products contain considerable amounts of nitrogen dioxide and water and, hence, nitric acid. Orig. art. has: 3 figures.

[W. A. 68]

[SM]

SUB CODE: 07, 19, 21/ SUBM DATE: 04Feb66/ ORIG REF: 004/ OTH REF: 001

Card 2/2

Theory and Technology of Industrial (Cont.) Call Nr: TP 270 .I2
COVERAGE: The first part of the textbook explains the theory of explosives which is necessary for understanding the action of explosives in mining operations. The second part reviews the properties of explosives used either directly or as admixtures to industrial explosives, and for triggering explosive devices. Chapter 19 describes widely used smokeless powders. The third part of the textbook is devoted to explosives commonly used in blast-mining operations. Persons credited with valuable counsel during preparation of this book are: Andreyev, K.K.; Professor, Candidate of Technical Sciences, Voronov, A.V.; Candidate of Technical Sciences, and Apin, A.Ya; Scientific Editor. The bibliography contains 20 Soviet references.

Card 2/9

SVETLOV, B.Ya., kand.tekhn.nauk; SOLNTSEVA, R.N., inzh.; TITUSHINA, M.I.,
inzh.

Granular explosives for charging flooded boreholes in opencut
workings. Vzryv.delo no.44/1:40-57 '60. (MIRA 13:7)
(Explosives)
(Strip mining)

SVETLOV, B.Ya., kand.tekhn.nauk

Toxic gases in blasting operations. Vzryv. delo no.45:101-116
'60. (MIRA 14:1)
(Blasting) (Gases, Asphyxiating and poisonous)

SVETLOV, B.Ya.

Some characteristics of the explosive transformation of alumina
containing explosives. Vzryv. delo no.52/9:57-67 '63.
(MIRA 17:12)

1. Mezhdueedomstvennaya komissiya po vzryvnomu delu.

SVETLOV, B.Ya.; SOLNTSEVA, R.N.

Chemical stability of aluminum in the composition of industrial
explosives. Vzryv. delo no.52/9:67-80 '63. (MIRA 17:12)

1. Mez'duvedomstvennaya komissiya po vzryvnomu delu.

AUTHORS: Bokshcheyn, B. S., Magidson, I. A. and Svetlov, I. L.
 TITLE: On Diffusion in the Bulk and at the Boundaries of Grains (0
 diffuzii v ob'yem i po granitsam zeren)
 PERIODICAL: Fizika metallov i metallovedeniye, 1958, Vol 6, Nr 6,
 pp 1040-1052 (USSR)

ABSTRACT: Fisher (Ref.9) was the first to give a theoretical analysis of superposition and interaction of grain-boundary and bulk diffusion in a polycrystal. He discusses diffusion in a semi-infinite crystal with grain boundaries perpendicular to the crystal surface (Fig.1). A grain boundary was represented by a "slot" of thickness δ . The coefficients of diffusion at the boundary and in the bulk of a grain were D_2 and D_1 respectively. It was assumed that D_2 is $\gg D_1$ and therefore the vertical component of the bulk diffusion was neglected; diffusion was taken to occur predominantly at right angles to the boundary. The concentration of the diffusing substance at the surface of the sample was assumed to be constant and equal to c_0 ; D_1 and D_2 were independent of concentration. Solving differential equations for diffusion along the boundaries and in the bulk of grains,

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CIA-RDP86-00513R001654120015-6"

On Diffusion in the Bulk and at the Boundaries of Grains

Fisher found a simple expression for c_0 which is the concentration of the diffusing substance in the grain. The "slot" model described by Fisher was developed further by Golikov and Borisov (Ref.12), who estimated the limits of applicability of Fisher's solution. The "slot" model is only a rough approximation. It describes diffusion in a single boundary and therefore cannot allow for dimensions of grains and interaction between grain boundaries. This model is not suitable for grains of small size, for small ratios of the diffusion coefficients and for long diffusion times. It cannot be used at all to describe diffusion in mosaic blocks. The authors describe a different diffusion model. They regard a polycrystal as an assembly of grains in the form of spheres (Fig.2). They assume that the packing is somewhat denser than for perfect spheres, since in general the grain shapes are not spherical. The grain boundaries are treated as a separate phase with its own properties. It is assumed that at a certain distance r_0 from the centre of each grain there

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On Diffusion in

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On Diffusion in the Bulk and at the Boundaries of Grains
unit volume. The authors show that for non-spherical grains
 $\eta/H = 2/a_0$, where a_0 is the smallest separation between
grains. The diffusion equations with their initial and
boundary conditions can be then written as follows:

$$\frac{\partial w}{\partial t} = D_1 \left(\frac{\partial^2 w}{\partial r^2} + \frac{2}{r} \frac{\partial w}{\partial r} \right), \quad (9)$$

$$\frac{\partial u}{\partial t} = D_2 \frac{\partial^2 u}{\partial x^2} - \frac{2}{a_0} D_1 \frac{\partial w}{\partial r} \Big|_{r=r_0}, \quad (10)$$

$$u(0, t) = u_0, \quad (11')$$

$$u(x, 0) = 0, \quad (11'')$$

$$w(x, r_0, t) = \gamma_0 u(x, t), \quad (12')$$

$$w(x, r, 0) = 0. \quad (12'')$$

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On Diffusion in the Bulk and at the Boundaries of Grains

$$K(p) = \sqrt{p} \frac{\exp(\sqrt{p}) + \exp(-\sqrt{p})}{\exp(\sqrt{p}) - \exp(-\sqrt{p})} - 1 = \sqrt{p} \operatorname{cth} \sqrt{p} - 1, \quad (17)$$

$$\bar{c} = \bar{\gamma} \bar{u} \frac{\exp(\sqrt{p} \bar{p}) - \exp(-\sqrt{p} \bar{p})}{\exp(\sqrt{p}) - \exp(-\sqrt{p})}, \quad (18)$$

and $\gamma = \gamma_0 r_0$. The solution of Eq.(16) is rewritten in terms of variables used in Eqs.(9-12") and simplified for certain special cases. The solution was used to calculate the diffusion coefficients using the experimental data of Bokshteyn et al (Ref.5). These diffusion coefficients are given in a table on p 1045 together with the results of calculations using Fisher's method and two other methods. The "spherical" model used by the authors may be used to describe diffusion in powders, eutectic-type two-phase mixtures, and between mosaic blocks. The paper is entirely

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On Diffusion in the Bulk and at the Boundaries of Grains

theoretical. There are 2 appendices, 1 table and 14 references; 6 of the references are Soviet and 8 English.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: June 23, 1956.

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18(7)

SOV/32-25-9-15/53

AUTHORS: Krasil'shchik, V. Z., Svetlov, I. L., Bronfin, M. B.

TITLE: Determination of the Diffusion Coefficient According to the Method of Residual Gamma Activity

PERIODICAL: Zavodskaya laboratoriya, 1959, Vol 25, Nr 9, pp 1072-1074 (USSR)

ABSTRACT: The simplified method (Ref 3) of the removal of thin layers for the determination of diffusion in solid bodies based upon a measurement of the difference of radioactivity in a certain layer depth, contain a large determination error. It was found that, if the diffusion coefficient (D) is not determined according to the gamma activity, but according to the absolute values, the determination accuracy may be increased. For this purpose the relationship between the value of the integral gamma activity of the sample, from which a layer of the thickness h was taken, and the value (D) must be determined. A diagram of

the function $\phi^{-1}\left(\frac{I_0 - I_h}{I_0}\right)$ (I_0 = initial activity (pulses/min)

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proportional to the quantity of the radioactive element placed upon the sample surface, I_h = integral activity of the sample

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According to the Method of Residual Gamma Activity

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after the removal of a layer of the thickness h) versus the thickness h of the removed layer, is obtained; it is a straight line from whose tangent of the inclination angle the value (D) may be directly determined. The autodiffusion of zinc was investigated to test the method. 99.9%-Zn and the radio isotope Zn^{65} were used. The intensity of the radioactive radiation was measured on the apparatus B-2 with a gamma counter MS-4, and the autodiffusion of Zn at 325, 350, 375, and 400° was investigated after 40, 34, and 22 hours. The maximum determination error of (D) amounts to 10% (Table). There are 1 figure, 1 table, and 5 references, 3 of which are Soviet.

Card 2/2

BOKSHEYN, S.Z.; KISHKIN, S.T.; SVETLOV, I.L.

Breaking test for whiskers of copper, nickel, and cobalt
crystals. Fiz.tver.tela 4 no.7:1735-1742 J1 '62.

(MIRA 16:6)

(Strength of materials--Testing) (Metal crystals)

S/032/62/028/005/006/009
B117/B101

AUTHORS: Bokshteyn, S. Z., and Svetlov, I. L.
TITLE: Determination of shape and size of cross section in filiform crystals
PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 5, 1962, 595 - 596

TEXT: The strength of filiform crystals is said to be best determined from the shape and size of cross section on the crystal fracture point. The cold-hardening plastic 712-9M-XO (712-9M-KhO) was used in devising a method of producing microcuts and of determining the shape and size of the cross section. The plastic was poured into a special frame to prevent the crystal from warping and, after polymerization, the microcuts were produced by the usual method, and examined with an MSK-6 (MBI-6) microscope under 2000-fold magnification. More than 50 threadlike copper crystal cuts were examined in this way. The cross sections of crystals obtained by reduction of copper iodide were mostly hexagonal, less frequently square or rectangular; a good number were of bizarre shapes. The range of areas, s , of

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ratio between strength and diameter, \sqrt{s} , of cross section. The greatest strength ($> 200 \text{ kg/mm}^2$) was found in crystals of 2-3 μ diameter. Crystals of 10-15 μ diameter were found to be as strong as bulky specimens. The method can be used to determine the cross section of very fine wires. The two most important English-language references read as follows: S. S. Brenner. Acta Met., 4, 268 (1956) and J. Appl. Physics, 27, no. 12, 1484 (1956).

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L 10502-63

EMP(q)/EWT(m)/BDS--AFFTC/A: D--JD

S/0181/63/005/006/1749/1750

ACCESSION NR: AP3001307

AUTHOR: Bokshteyn, S. Z.; Svutlov, I. L.

TITLE: The effect of alloying on the strength properties of copper whiskers

SOURCE: Fizika tverdogo tela, v. 5, no. 6, 1963, 1749-1750

TOPIC TAGS: copper whisker, copper-silver alloy-whisker, strength, alloying, silver, impurity, size effect

ABSTRACT: In an attempt to explain the high strength exhibited by whiskers of certain substances, the role of impurities was investigated. Copper whiskers dusted in a vacuum of 10^4 mm Hg with silver powder were annealed in vacuum or in a stream of hydrogen under conditions assuring diffusion of the silver to the center of the thickest whisker. The alloyed whiskers were then subjected to a tensile test. Alloyed whiskers more than 4.5μ in diameter were found to be stronger than the same size pure-copper whiskers; for small diameters the reverse was true. The dependence of strength on diameter (size effect) is far less marked in alloyed whiskers than in pure-copper whiskers. In thick whiskers,

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L 10502-63
ACCESSION NR: AP3001307

where the density of structural defects is high, silver apparently acts as a strengthener and the strengthening mechanisms are apparently the same as those usually associated with alloying (formation of a solid solution or precipitation of a second phase). Impurities in thin whiskers (d less than 4.5μ), however, apparently impair the perfectness of the crystal lattice and facilitate the nucleation of dislocations, thereby reducing the strength of the whiskers. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 08Feb63

SUB CODE: MA

DATE ACQ: 01Jul63

NO REF SOV: 001

ENCL: 00

OTHER: 000

ss/CH
Card 2/2

ACCESSION NR: AT4040419

S/0000/64/000/000/0155/0167

AUTHOR: Bokshteyn, S. Z.; Kishkin, S. T.; Svetlov, I. L.

TITLE: A study of the mechanical properties of Cu, Ni and Co whiskers

SOURCE: Protsessy* diffuzii, struktura i svoystva metallov (Diffusion processes, structure and properties of metals); sbornik statey. Moscow, Izd-vo Mashinostroyeniye, 1964, 155-167

TOPIC TAGS: copper whisker crystal, nickel whisker crystal, cobalt whisker crystal, whisker tensile strength, whisker structural defect, whisker alloying effect, whisker diameter effect, whisker microcrystalline dislocation, selective etching procedure

ABSTRACT: Whiskers of Cu, Ni and Co (length = 1.5-3 mm, diameter = 2-15 μ), grown by hydrogen reduction of anhydrous haloid salts, were tested for tensile strength in relation to crystal diameter and orientation of its long axis, as well as for variation in strength lengthwise and the effect of alloying (diffusive saturation of Cu with Ag) on mechanical properties. Selective etching was used to expose microcrystalline dislocations in the Cu. The results indicate substantial divergence in relation to diameter, especially for very small diameters of 2 - 3 μ . Empirical relationships were derived between diameter and tensile strength,

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ACCESSION NR: AT4040420

S/0000/64/000/000/0168/0176

AUTHOR: Bokshteyn, S. Z.; Nazarova, M. P.; Svetlov, I. L.

TITLE: Growing of sapphire fiber crystals

SOURCE: Protsessy* diffuzii, struktura i svoystva metallov (Diffusion processes, structure and properties of metals); sbornik statey. Moscow, Izd-vo Mashinostroyeniye, 1964, 168-176

TOPIC TAGS: aluminum oxide crystal, aluminum oxide whisker, aluminum oxide, whisker growth, whisker

ABSTRACT: Equipment and techniques for growing sapphire whiskers are described. The equipment consists of a tubular electric furnace with an aluminum tube and a hydrogen supply source with purification and feed systems. The initial charge, aluminum powder mixed with 3-6% aluminum oxide, is placed in aluminum boats and held for 1-2 hr at 1360-1390C at atmospheric pressure in a current of purified hydrogen containing water vapor at a partial pressure of 10^{-3} atm. The boat, with reaction products, is then cooled to 500C in a current of hydrogen. There are three distinct zones along the boat length.

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ACCESSION NR: AT4040420

In the first zone, facing the hydrogen current, relatively large microcrystals grow, mostly in the form of elongated plates, needles, or tetragonal prisms. The longer the boat, the greater the number of such microcrystals. The whiskers grow in the next zone, on the bottom and sides of the boat. They are 10—15 mm long with a diameter between 1 and 15 μ . Most of them have a smooth shiny surface. The rest of the boat is filled with a loose, fluffy deposit topped with a multitude of very fine, short fibers. Whiskers grown in porcelain boats have many branches and a rough surface. Whiskers were also found on the walls of the alundum tube, which proves that the whiskers grow from the vapor phase. As proved earlier, the growth proceeds by the mechanism of screw dislocation. Orig. art. has: 7 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 09Dec63

SUB CODE: S5

DATE ACQ: 28May64

NO REF SOV: 000

ENCL: 00

OTHER: 007

Card 2/2

S/0181/64/006/005/1261/1266

ACCESSION NR: AP4034900

AUTHORS: Bokshhteyn, S. Z.; Kishkin, S. T.; Nazarova, M. P.; Svetlov, I. L.;
Umantsev, E. L.

TITLE: Growth of sapphire whisker

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1261-1266

TOPIC TAGS: whisker crystal, crystal growth, sapphire, sapphire whisker

ABSTRACT: Whisker crystals of Al_2O_3 were grown by high-temperature oxidation of powdered metallic Al in an atmosphere of moist hydrogen. The reaction temperature was 1350—1400C. The authors describe a special apparatus used for growing these crystals, which consists of three essential parts: a tubular furnace, a hydrogen source, and a system for purification and control of hydrogen feed. The whisker crystals ranged from 1 to 30 μ in diameter and from 3 to 15 mm in length. Microcrystals ranged from 30 to 350 μ in diameter, and 0.5 to 3 mm in length. Capillaries were observed along the growth axes of some crystals.

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S/0032/64/030/009/1133/1136

ACCESSION NR: SAP4044901

AUTHOR: Svetlov, I. L.

TITLE: A machine for mechanical tests of acicular crystals (whiskers)

SOURCE: Zavodskaya laboratoriya, v. 30, no. 9, 1964, 1133-1136

TOPIC TAGS: acicular crystal, crystallography, crystal deformation/ KWT potentiometer, MM 1 micromanipulator, SD 2 electromotor, M 24 indicator, 6S1P triode

ABSTRACT: The special problems inherent in the testing of "whisker" crystals are explained as being caused by the sensitivity and flexibility of the testing instrument. A machine was developed for use in investigating acicular crystals undergoing elastic and plastic deformation. The apparatus consists of three major parts: a "micromachine" part, a measuring part, and an electronic potentiometer register. The micromachine part provides a means for applying and centering the tensile force. A detailed schematic diagram is given showing the dimensions and functional parts of the micromachine. The measuring part consists of a high-frequency generator assembled with a 6S1P triode and quartz resonator. An M-24 indicator and a micro-manipulator MM-1 are used within the measuring unit. The method of testing includes observations of the elastic and plastic zones of crystal deformation. A KWT

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L 12100-66 EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD
 ACC NR: AP6000529 SOURCE CODE: UR/0070/65/010/006/0845/0849
 AUTHOR: Lyuttsau, V. G.; Fishman, Yu. M.; Svetlov, I. L.
 ORG: Institute of Machinery Studies (Institut mashinovedeniya)
 TITLE: X-ray studies of the dislocation structure of filamentary copper crystals
 SOURCE: Kristallografiya, v. 10, no. 6, 1965, 845-849
 TOPIC TAGS: fiber crystal, crystal lattice dislocation, x-ray crystallography, crystal structure
 ABSTRACT: The high elasticity limit of filamentary crystals has not yet been clarified. One of the approaches to the problem is to study directly the dislocation structure of such crystals. The most appropriate method for the investigation of filamentary crystals of medium thickness is the micro x-ray diffraction approach developed by A. R. Lang which was applied earlier to the study of the dislocation structure of NaCl crystals (W. W. Webb, J. Appl. Phys., 31, 194, 1960). The present authors used a Hilger diffractometer to study the block and dislocation structure of filamentary crystals of copper. The main result of the investigation is the discovery that as the size of the crystals decreases they become increasingly perfect. The relationship between the structure and the
 UDC: 548.4
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L 12100-66

ACC NR: AP6000529

strength of filamentary crystals will be established during future comparisons of the results of structural and mechanical investigations carried out on the same samples. The authors thank B. M. Rovinskiy, V. L. Indenbom, and V. N. Rozhanskiy for the discussion of the results of the work. Orig./art. has: 5 figures. ⁹_{44, 55}

SUB CODE: 20 / SUBM DATE: 15Dec64 / ORIG REF: 006 / OTH REF: 012

Card 2/2

L 9442-66 EWT(m)/T/EWA(o)/EWP(b)/EWP(t) IJP(c) JD/HW

ACC NR: AP5027415 SOURCE CODE: UR/0181/65/007/011/3348/3355

AUTHOR: Vokshteyn, S. Z.; Svetlov, I. L.

ORG: none

TITLE: Peculiarities of the plastic deformation of copper and cobalt whiskers

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3348-3355

TOPIC TAGS: copper, copper whisker, cobalt, cobalt whisker, elastic deformation, whisker deformation, whisker mechanical property

ABSTRACT: Copper whiskers, 4—30 μ thick, and cobalt whiskers, 9—22 μ thick, were subjected to tensile tests at a constant strain rate of 50 and 100 μ /min, respectively. The stress-strain diagrams for both metals were characterized by three clearly defined stages: elastic, "easy-slip," and strain-hardening (see Fig. 1). Copper whiskers always fractured at the "neck" at a stress equal to the tensile strength of copper single crystals (13—35 kg/mm^2). The average yield strength of cobalt whiskers was 2.9 kg/mm^2 , regardless of the whisker dimensions. With increasing whisker diameter from 9 to 20 μ , the ratio of the elastic limit to yield

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L 9442-66

ACC NR: AP5027415

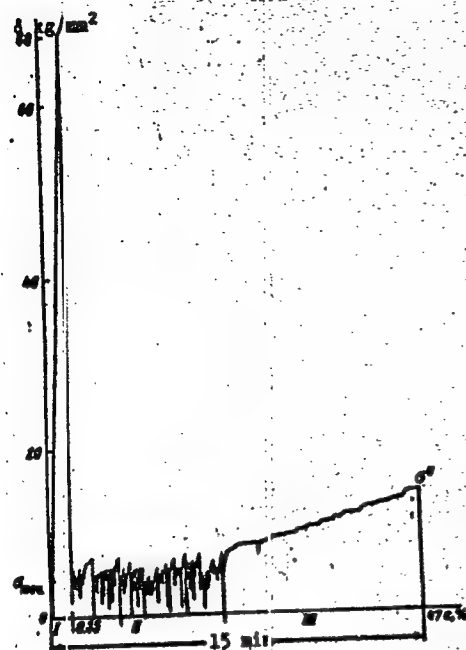


Fig. 1. Stress-strain diagram for a copper whisker $49 \cdot 10^{-6} \text{ mm}^2$ in cross section with an axis of growth along the [111] direction.

I - Elastic stage; II - easy slip;
III - strain hardening.

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L 9442-66

ACC NR: AP5027415

strength decreased from 54 to 24; the total plastic deformation reached 500—700%.
Orig. art. has: 4 figures and 2 tables. [15]

SUB CODE: 11/ SUBM DATE: 20Feb65/ ORIG REF: 005/ OTH REF: 006/ ATD PRESS: 4/55

jw
Card 3/3

L 22543-66 ENT(1)/ENT(m)/ENT(t) IJP(c) JD/GG
 ACC NR: AP6009644 SOURCE CODE: UR/0181/66/008/003/0688/0695

AUTHOR: Bokshteyn, S. Z.; Kishkin, S. T.; Svetlov, I. L.

ORG: none

TITLE: Influence of orientation, dimension, state of surface, and alloying of
 filamentary crystals of copper on the form of the deformation diagram in uniaxial
 tension

SOURCE: Fizika tverdogo tela, v. 8, no. 3, 1966, 688-695

TOPIC TAGS: copper, fiber crystal, stress analysis, plastic deformation, single
 crystal

ABSTRACT: In view of the fact that no previous tension strain diagrams of fila-
 mentary crystals have been made in the past, the authors measured the tension
 strain diagrams of copper whiskers whose growth direction coincided with the
 angles of the standard stereographic triangle. The peculiarities of the stress-
 strain curves of thick whiskers, samples with a silver-surface film, and alloyed
 whiskers were also investigated. The experimental procedure and the technique of
 obtaining the strain diagrams was described in detail by the authors earlier (FTT
 v. 7, 3348, 1965). The dependence of each parameter of the diagram (elastic limit,
 plastic-flow stress, ultimate strength, hardened coefficients in the linear stage,

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ACC NR: AP6028026

SOURCE CODE: UR/0251/66/042/001/0045/0049

AUTHORS: Tavadze, F. N. (Academician AN GruzSSR); Surmava, G. G.; Svetlov, I. L.

ORG: Georgian Metallurgical Institute (Gruzinskiy institut metallurgicheskiy)

TITLE: Investigation of diffusion in microwires of copper

SOURCE: AN GruzSSR. Soobshcheniya, v. 42, no. 1, 1966, 45-49

TOPIC TAGS: copper, zinc, wire, metal diffusion

ABSTRACT: The diffusion of zinc in microwires of copper was studied. The wire specimens were prepared after the method of A. V. Ulitovskiy (Tonkaya provoloka v sploshnoy steklyannoy izolyatsii i vozmozhnosti yeye primeneniya. Pribory i tekhnika eksperimenta, 3, 1957, 11). The diffusion of zinc in the wire specimens was studied after the method of B. S. Bokshteyn, A. A. Zhukhovitskiy, and G. G. Surmava (Metodika i ustanovka dlya izucheniya diffuziy v nitevidnykh kristallakh. Zavodskaya laboratoriya, 4, 1966). The specimens had diameters of 6 and 20 microns. The diffusion was studied at 600, 650, and 700C, and the experimental results are summarized in graphs and tables (see Fig. 1). It was found that the activation energy for diffusion of zinc was approximately 22.5 kcal/mole and that the thermal dependence of the diffusion coefficient in thin and thick copper specimens was

$$D = 4.3 \cdot 10^{-8} \exp(-24000/RT)$$

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ACC NR: AP6028026

respectively.

$$D = 1.9 \cdot 10^{-8} \exp(-26000/RT),$$

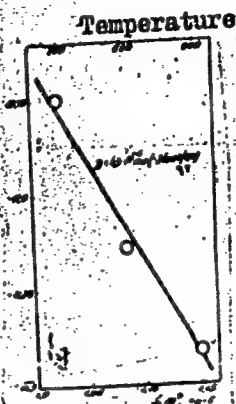


Fig. 1. Thermal dependence of the diffusion coefficient for zinc in thin microwires of copper ($d_0 \approx 6$ microns)

Orig. art. has: 1 table, 5 graphs, and 7 equations.

SUB CODE: 11/ SUBM DATE: 28Jul65/ ORIG REF: 005/ OTH REF: 003

Card 2/2

NETL 111
USSR/Medicine - nutrition

FD-3070

Card 1/1 Pub. 141 - 16/23

Author : Svetlov, I. P.

Title : The use of blood tests for estimating the nutritional status of
 children in children's collectives

Periodical : Vop. pit., 46-46, May/Jun 1955

Abstract : Made blood analyses of children 11-12 years of age from two collectives.
 The blood was analyzed for vitamins C and A, carotin, phosphatase, and
 codehydrase. Vitamin A was almost completely absent, while carotin was
 detected in all children. The vitamin C content was very low during
 the spring months, but was increased during the fall. The phosphatase
 level was high during both spring and fall, and the codehydrase level
 was found to be similar to that of adults. This method permits one
 to judge the nutritional status of children. No references.

Institution : Scientific-Research Sanitary Institute imeni F. F. Erisman, Moscow

Submitted :

NOVOZHILOV, P.V.; SVETLOV, K.I.

Gold ore in a tufaceous formation. Trudy VITR no.4:195-197 '61.
(MIRA 14:9)

(Gold ores)

KONSTANTINOV, V.Ye., kand. tekhn. nauk; SVETLOV, K.S., inzh.

Examination of systems of natural exhaust ventilation in
multistoried buildings. Vod. i san. tekhn. no.6:10-13
Zs '65. (MIRA 18:8)

SVETLOV, I. (Moscow).

Plan for the organization of the first Russian private printing plant. Poli-
gr.proizv. no.7:24-25 JI-Ag '53. (MIRA 6:9)

(Printing plants--History)

SVETLOV, M. (Moskva)

Photoelectric relaxation switch. Radio no. 11:21-22 N '60.
(MIRA 14:1)

(Photoelectric cells)

(Electric switchgear)